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Artificial Insemination in Nigeria using air transported bull semen

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Introduction

THE artificial insemination of Zebu cows with Friesian semen was undertaken with the object of investigating the productivity of the resulting crosses in suitably situated urban dairies in Nigeria. The work was carried out at the Livestock Investigation Centre, Vom, which is situated on a plateau 4,500 feet above sea level; the conditions were not, therefore, typical of West Africa. The choice of Friesian as the exotic breed to be used did not meet with general approval, but in view of work in Trinidad by L. R. Hutson (1953) the results may prove better than expected. As an adequate supply of solid carbon dioxide was not available in Vom, it was decided to send, by air, three fresh samples of semen each week, for a period of three months. All consignments of semen came from bulls at the Little Horwood Cattle Breeding Centre, Buckinghamshire.

Semen

The semen was collected in the ordinary way, examined for density, motility, and then buffered in 50 per cent. egg yolk sodium citrate diluent. The raw semen was added to the diluent when the latter was at a temperature of 28° to 30° C. and to which penicillin and streptomycin had been added, to give a concentration of 500 units per c.c. of each of these antibiotics in the diluted semen.

The mixture was then gently agitated and allowed to stand for 15 minutes at room temperature to facilitate antibiotic action. Cooling to 4° C. was effected in a refrigerator. Dilution rates at the Little Horwood Centre are normally in the region of 1 in 25 but the semen supplied to Vom was diluted 1 in 10. When the diluted semen had cooled to 4° C. it was transferred to a test tube, corked, sealed, wrapped in brown corrugated paper and enclosed in an empty rubber balloon. The protected test tube was then packed in cracked ice in a two-pint thermos flask which was placed in a cardboard container and taken to the airport. Semen collected early one day reached Vom *via* Kano at midday the next. With only two consignments was there an appreciable delay. On arrival the semen was unpacked, examined and stored in a refrigerator.

Insemination

The cows inseminated were all of the *Bos indicus* type, being nondescript cattle of mixed white Fulani, Red Sokoto or Adamawa origin. The heat period of these cows was of short duration and the method of detecting oestrus was by the use of an aproned bull. Confirmation of heat was made by rectal palpation of the uterus and ovaries. The technique of recto-vaginal manipulation, as commonly employed in European breeds of cattle, was complicated by the sloping floor of the pelvis and sacrum. It was found impossible in some young heifers to pass the normal inseminating tube through the os uteri. In these animals the semen was deposited round the os. All pregnancy examinations were made eight weeks after insemination. At this time the sloping pelvis and sacrum aided diagnosis, as the uterus, even in multiparous animals, is seldom extrapelvic until the 10th to 12th week of pregnancy.

Conception Rates

Sixty-three inseminations from 40 samples of semen were carried out. Pregnancy tests showed 29 cows to be in calf. The relevant figures and percentages are as follows:—

	Number	In Calf	Percentage
Total Inseminations ...	63	29	46·0
1st Insemination ...	45	23	51·1
2nd Insemination ...	14	5	35·7
3rd Insemination ...	4	1	25·0

Probably more significant are the figures showing conception rates in relation to the age of the semen.

Age of Semen	Number of Inseminations	In Calf	Percentage
24—36 hrs. old ..	23	15	65·2
36—60 hrs. old ...	28	10	35·7
60—84 hrs. old ...	9	4	44·4
Over 4 days old ...	4	0	0

Of the 31 cows inseminated only once, 23 are in calf, five have settled by natural service and three are as yet empty. Of the 14 cows inseminated twice, five conceived to artificial insemination and four were inseminated for a third time. Of the remainder, four are in calf by natural service and one has yet to settle. Only one of the four cows inseminated thrice conceived. Two of the remaining three cows were served by a bull but the third showed occlusion of the Fallopian tubes and was slaughtered.

In view of the recent article by S. W. G. Van Rensburg and L. E. A. Rowson (1954) it is interesting to compare the results obtained in South Africa using aerial-transported deep-frozen semen with those of Vom using air-transported liquid semen.

	S. Africa	Vom
Cows inseminated with imported semen	39	45
Total inseminations	51	63
Conceived to insemination	23	29
% conception to imported semen ...	59·9%	64·4%
Conceived to local bulls	2	11
Not in calf	10	5
Died	1	—

Conclusions

The results of inseminations with semen only 24 to 36 hours old (65.2 per cent.) show that the aerial transport had no effect on the fertilising capacity of the semen diluted 1 in 10 at that age. The drastic fall in conception rates using two- or three-day-old semen compares most unfavourably with the conception rate of deep-frozen semen up to three months old. We must, therefore, conclude that insemination with air-transported liquid semen can be successfully carried out up to approximately 48 hours after collection, and where frozen carbon dioxide is not available, may prove useful.

Summary

Bull semen was collected at the Little Horwood Centre, diluted 1 in 10, packed in thermos flasks and transported by air to Vom.

2. Forty-five cows were inseminated from 40 samples of fresh semen received over a period of three months.

3. In all 29 cows conceived, 23 to the first insemination, five to the second and one to the third.

4. Comparison is made with results obtained in South Africa using air-transported deep-frozen semen.

The Carrier Animal in Bovine Parasitic Bronchitis: A Knackery and Farm Survey

BY

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IN a recent publication (Jarrett, McIntyre, Urquhart & Bell, 1955) we discussed the rôle of winter carriers of *Dictyocaulus viviparus* in the epidemiology of bovine parasitic bronchitis. The material discussed was obtained by repeated faecal sampling of herds previously affected with severe husk, by autopsy of selected animals from these herds, and by a limited knackery survey. The results of the knackery survey appeared to indicate that there was a high carrier rate in yearling animals and in view of the obvious epidemiological importance of this finding the survey was repeated in 1955 on a larger scale.

Materials and Methods

Two knackeries were visited thrice weekly.

Knackery (1) is situated in Central Scotland and deals with carcases from central and eastern lowland farms. Knackery (2) is in Ayrshire and deals with the dairying districts of South-west Scotland. Approximately 1,500 pairs of bovine lungs were examined. These were unselected, and when possible each was labelled with the name of the farm of origin on removal from the carcase. The trachea, and the primary, secondary and tertiary bronchi of each of these lungs were cut open and examined macroscopically for lungworms. If a labelled lung was found to contain worms, a visit was made to the farm from which the animal came and an attempt was made to ascertain the following: the age of the animal and whether it was outwintered or kept indoors; if the latter, was it tied in a stall or free in a loose-box or court and for how long? When possible faecal samples were obtained from the same age group in the herd and examined by the Baermann technique.

Results

Knackery Survey

The results of this are recorded in Tables I and II. The term " stirk " is applied to young bovines which have completed their first season at grass.

Farm Survey

The results are tabulated in Table III. In all 46 farms were visited in only five of which were adult

Acknowledgment.—We are indebted to the Director of Veterinary Research, Vom, for assistance and interest in the work and for permission to publish this paper.

References

HUTSON, L. R. (1953). *Progress in Dairying at St. Joseph Stock Farm, Trinidad*, 1948-52.

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TABLE I
THE INCIDENCE OF CARRIERS AT KNACKERY (1)

Month	Adults		Stirks		Per cent. Adults	Per cent. Stirks
	Total	+ ve	Total	+ ve	+ ve	+ ve
January	43	0	11	1	0	9
February	62	2	27	4	3·2	14·8
March	102	2	33	11	2	33
April	73	0	36	9	0	25
May	118	0	14	4	0	28·5

TABLE II
THE INCIDENCE OF CARRIERS AT KNACKERY (2)

Month	Adults		Stirks		Per cent. Adults	Per cent. Stirks
	Total	+ ve	Total	+ ve	+ ve	+ ve
January	3	1	1	0	Not Significant	
February	80	2	42	13	2·5	31
March	240	11	135	55	4·5	40·7
April	191	17	94	32	9	34
May	178	6	59	11	3·4	18·6

animals involved. Thirty-four herds had a history of husk in the preceding autumn while 12 had none. In 25 the animals were wintered outdoors and in 21 were kept inside. Of the latter, on 14 farms the animals had been tied by the head in stalls, while on seven they were kept in loose-boxes. On four farms the animals had been tied for three months, on four for four months, on three for five months and on three for six months. Of those farms in which the animals were wintered in loose-boxes, three kept them inside for three months, one for four months, one for five months and two for six months.

On 24 farms faecal samples were obtained from animals in relevant age groups and in 11 of these farms (five outwintered, five tied in stalls, one in loose-boxes) larvae were found in the faeces of one or more animals. In 13 (seven outwintered, five tied in stalls, one in loose-boxes) no larvae were found in any of the samples.

Discussion

The way in which infection persists from year to year on a farm is of obvious importance in the control of parasitic bronchitis in cattle. In an earlier publication (Jarrett, McIntyre, Urquhart & Bell, 1955) we showed that this could take place by survival of the larvae on the pasture for periods of up to a year, by dressing pasture with organic manure containing larvae and by persistence of lungworms throughout the winter in the bronchi of infected animals. It was not known whether this carrier state was attributable to repeated reinfection of stock during the winter and spring, either when running free in loose-boxes or courts or when left all year at pasture, or whether it was due to an unusual longevity on the part of certain worms. The latter could be attributed to an extended life span of adult worms or to inhibited development of immature forms in partially immune animals as suggested by Taylor (1952). If this persistence throughout the winter were due only to repeated subclinical reinfection at pasture or in courts, then an obvious prophylactic measure against husk would be to prevent this reinfection by tethering. The present investigation was partly designed to settle this point.

It is also of great importance to know which particular age group or groups act as carriers and what the incidence of such animals is. From Tables I and II it will be seen that of 1,542 pairs of bovine lungs examined during the late winter and spring of 1955, 181 or 12 per cent. contained lungworms. Of this number 452 were from stirks which had been at pasture for only one season and of these 140 or 31 per cent. were infected as compared with an incidence of only 3.8 per cent. in the older age groups. It is therefore obvious that stirks are by far the most important of the age groups in carrying on the disease.

It is also noteworthy that the high incidence of stirk carriers continued until May at which time both adults and younger calves go to pasture. From the point of view of prophylaxis on farms with a history of husk it is, therefore, desirable to avoid turning young susceptible calves on to grass which has been grazed during the winter by stirks.

An example of the importance of the stirk as a carrier animal was encountered in our attempts to eliminate husk from farms by pasture control. On one farm 10 calves at grass for the first time in 1955 were on a field from which an undersown crop of oats had been taken in 1954. No animals had grazed the pasture after the oat crop was removed and no

TABLE III
RESULTS OF FARM SURVEY

Month	Number of Farms	History of Husk in Preceding Autumn	Management During Winter	Result of Faeces Examination
January	1	No	Stalled	Negative
February	1	Yes	Stalled	Negative
	1	Yes	Loose-box	Negative
	1	Yes	Stalled	Positive
	1	Yes	Outdoors	—
	1	Yes	Outdoors	—
March	1	Yes	Stalled	—
	2	No	Stalled	—
	7	Yes	Outdoors	Negative
	5	Yes	Outdoors	Positive
	4	No	Outdoors	—
	2	Yes	Stalled	Negative
	3	Yes	Outdoors	—
	4	Yes	Stalled	Positive
	1	Yes	Loose-box	Positive
	1	Yes	Loose-box	—
April	1	No	Stalled	—
	1	No	Outdoors	—
	3	Yes	Outdoors	—
	4	Yes	Loose-box	—
	1	No	Stalled	—
Total	46	34 Yes 12 No	25 Outdoors 14 Stalled 7 Loose-boxes	11 Positive 13 Negative

organic manure had been spread on the field. The 10 calves did very well until 11 stirks, some of which had had a relatively mild attack of parasitic bronchitis in 1954, were put into the same field as the calves. Within two weeks some of the young calves were noticed by the owner to be coughing. When we examined them five weeks after contact with the stirks two of the 10 were severely affected, the others moderately so. Four of them were excreting *Dictyocaulus* larvae in the faeces. Every effort was made on cross-examination of the owner to break down the history and explore other possibilities of infection. In the end the evidence seemed conclusive that the only possible source of infection had been the stirks which had been affected with husk in 1954.

The farm survey shows that the carrier state is not necessarily associated with constant reinfection since on 14 farms the relevant animals had been tied by the head in stalls for periods from three to six months before death and thus reinfection was almost certainly precluded. On several farms carriers were present although there was no history of husk for many years.

Although most of the infected lungs contained only about 5 to 20 lungworms it was found possible to detect larvae at a single examination of the faeces of living animals of the same groups in 11 out of 24 farms.

It has previously been shown both experimentally and in the field (Jarrett, Jennings, McIntyre, Mulligan & Urquhart, 1955) that animals which have recovered from a moderately severe attack of parasitic bronchitis acquire a relatively high degree of immunity to reinfection. Furthermore, it was also shown by repeated monthly faecal examinations or by autopsy, that in 91 field cases of parasitic bronchitis no larvae or worms could be demonstrated in 88 of these animals in the seven months following recovery (Jarrett, McIntyre, Urquhart & Bell, 1955).

This may be interpreted as meaning that cases which have recovered from a severe attack of parasitic bronchitis are not only immune to reinfection but also usually throw off their entire primary infection. This may mean that most carriers are animals which have not had a heavy infection and have therefore never acquired a high degree of immunity. This hypothesis is supported by the fact that in the present survey the carriers from eight out of nine farms for which accurate individual histories were available had not been clinically affected the previous year, although animals of the same age which had been grazing with them had been markedly affected.

The outstanding remaining gap in our understanding of the epidemiology of parasitic bronchitis is knowledge of the way in which the small number of larvae present on the pasture in the late spring is augmented to the level capable of producing clinical disease. This will probably depend upon the climate, the density of stocking and the time elapsing between grazing by stirks and by susceptible animals.

Two main points in control are, however, clear. In wettish western districts, larvae can survive the winter on pasture and the provision of clean grass for calves and susceptible adults is the only absolute remedy. This may appear to be a counsel of perfection, but on a farm which has suffered heavily from the disease it must be given serious consideration. Secondly, since the main carrier group is that of animals which have had only one grazing season, such potentially dangerous stirks should not be grazed with calves; and as long a time interval as is compatible with the husbandry requirements of any individual farm should be left between the time yearlings leave the pasture and that at which it is grazed by calves or older susceptible animals.

Summary

1. The incidence of carriers of bovine lungworms was studied during the first five months of 1955 in two knackeries in Scotland.

2. Thirty-one per cent. of stirks were affected as against only 3.8 per cent. in older age groups.

3. In a farm survey it is shown that bovines may harbour lungworms for up to six months in the absence of reinfection.

4. The significance of these findings is discussed.

Acknowledgment.—This work was supported by a grant from the Agricultural Research Council.

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JARRETT, W. F. H., MCINTYRE, W. I. M., URQUHART, G. M., & BELL, E. J. (1955). *Vet. Rec.* **67**, 820.

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TAYLOR, E. L. (1952). B.V.A. Publication No. 23, London.

BOOK REVIEW

Merck Veterinary Manual. Published by Merck & Co., Ruhway, New Jersey, price £3.

This really is an astonishing book. Within the limits of veterinary science it is virtually encyclopaedic in its scope.

The book comprises some 1,300 pages, divided into six parts, part one being the most comprehensive, and is sub-divided into sections under code headings which are easily found throughout the text. Part four is worthy of special mention, dealing as it does with the less usual veterinary patients including fish, cage birds, and zoo animals. It is obvious that in a book of this size no reviewer could hope to read it through; suffice it to say that we have dipped into it at random as fancy or need has taken us and have so far not found it wanting. In every case sufficient information has been found either fully to meet the inquirer's need, or to indicate on what lines more detailed information should be sought. So excellent is the book that it does seem a pity that it could not have been taken just one stage further to include at best a brief bibliography under each heading; another minor criticism is that the section on alternative proprietary preparations in the addendum is an excellent conception but not nearly exhaustive enough in fact.

This work is produced primarily for the veterinarian of North America but most of the data is valuable for British veterinary surgeons, although the importance of certain disease conditions may vary.

It is difficult to think of many types of veterinary workers for whom the manual holds no appeal; in most cases a brief perusal results in purchase, and that surely says enough.

NEWS AND COMMENT

Legal Note

A case of interest to the profession especially those who number poultry farmers among their clients, was decided recently in the High Court. Mr. C. G. Morgan, a poultry farmer, took an action against Messrs. May & Baker alleging that, by dosing his flock with the Company's product Embezin in order to arrest an outbreak of what he believed to be coccidiosis, he suffered substantial losses through death and enforced culling. The plaintiff's case was that the Company had been negligent in not making clear in their literature the possibility of toxic hazards in their preparation.

The case lasted for a number of days and several veterinary scientists gave evidence. In his summing up Mr. Justice Lloyd-Jacob found no negligence on the part of the Company and held that their literature was as fully explanatory as the existing state of knowledge made possible. He held, further, that in giving his poultry a second course of the drug, in spite of the Company's printed warning against over-dosage, the plaintiff contributed to the loss among his flock. In consequence the judge dismissed the action with costs against the poultry farmer.

From a professional point of view it was gratifying to hear the enconiums passed by the judge upon veterinary research workers in the poultry field, several of whom he named in the course of his judgement. He referred, too, and at some length, to the benefit derived by the poultry industry from preparations evolved and exhaustively tested by veterinary scientists.

Not without significance was the reason for dosing the poultry in the first place. The farmer, instead of seeking professional advice, had himself, together with his manager, diagnosed coccidiosis. When some of the birds were sent for post-mortem, a number were found not to be suffering from coccidiosis at all. Indeed, it was established in evidence that prior to treatment the flock was suffering a comparatively high incidence of fowl paralysis and staphyloccocal arthritis.

New Appointments: Colonial Veterinary Service

Mr. D. W. Brocklesby, Veterinary Research Officer, Protozoologist, East Africa High Commission (East African Veterinary Research Organisation, Muguga, Kenya); Mr. R. I. C. Hyam, Veterinary Officer, Northern Rhodesia; Mr. W. R. Nunn, Veterinary Officer, Uganda; Mr. D. J. Skinner, Veterinary Officer, Kenya.

The Horseshoe Club

Last month saw the creation of a new veterinary society - one exceptional in that it has a single rule, no regulations and not even a fixed subscription! The single rule is that membership is confined to veterinary surgeons in whole-time commercial appointments. This new group, "The Horseshoe Club", has been formed to provide the opportunity for social contact and discussion of matters of common interest to the sixty members of the profession so employed in the British Isles. At the inaugural meeting, the thirty-one members of the profession present agreed to be founder-members and unanimously elected Dr. R. F. Montgomerie and Mr. Bruce V. Jones as Chairman and Secretary respectively.

The Sir Frederick Smith and Miss Aleen Cust Research Fellowships

Applications are invited for a Fellowship, value £600 per annum to enable the holder to pursue research or to prepare for such research in any branch of veterinary science. Candidates, who need not be veterinary surgeons, will normally be required to have obtained some post-graduate experience, but this is not essential. The Fellowship is tenable for a maximum period of three years. Forms of application and copies of the Regulations may be obtained from the Registrar, The Royal College of Veterinary Surgeons, 9 Red Lion Square, London, W.C.1., to whom completed forms should be returned by 15th May, 1956.

R.C.V.S. Obituary

We record with regret the deaths of the following members of the profession:-

METIVIER, Harry Vincent Mercer, O.B.E., I.S.O., B.Sc., Department of Agriculture, St.Clair, Port of Spain, Trinidad, B.W.I., Captain late R.A.V.C. Graduated July 7th, 1915, London. Died February 20th, 1956, aged 64 years.

WEIR, Frederick Joseph, c/o Barclays Bank (D.C. & O.), Somerset West, C.P., South Africa, Major late R.A.V.C. Graduated December 14th, 1910, Dublin. Died January 28th, 1956.

Major Weir was buried in the English Cemetery at Somerset West and was accorded military honours. Dr. G. N. A. Hall, O.B.E., M.R.C.V.S., acted as principal pall-bearer. We hope to publish a short appreciation as soon as printing conditions allow.

WALKER, Alexander Anderson, 126 Freiston Road, Boston, Lincs. Graduated May 23rd, 1901, N. Edinburgh. Died February 11th, 1956, aged 77 years.

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COMING EVENTS

March

7th (Wed) A.G.M. of the Scottish Metropolitan Division, B.V.A. at the Royal (Dick) School of Veterinary Studies, 3 p.m.
A.G.M. of the A.V.T. & R.W's (Northern Region) at the Veterinary Hospital, Liverpool at 2 p.m.
8th (Thurs.) A.G.M. of the Midland Counties Division, B.V.A. at the Birmingham Medical Institute, 154, Great Charles Street, Birmingham at 2.30 p.m.
15th (Thurs.) General Meeting of the South Eastern Division, B.V.A. at the Royal Star Hotel, Maidstone at 2.30 p.m.
Informal Dance of the Yorkshire Division, B.V.A. at Parkway Hotel, Bramhope, Leeds. Tickets: Mr. A. J. Adams, 485 Bradford Road, Thornbury, Bradford.
16th (Fri.) The V.V.B.F. Ladies' Guild Dance at the Luncheon Club, Ministry of Agriculture, Tolworth, 8 p.m.
General Meeting of the Lincolnshire & District Division, B.V.A. at the George Hotel, Grantham, at 2.15 p.m.
21st (Wed.) Laboratory Meeting of the Section of Comparative Medicine, R.S.M., in the National Institute for Medical Research, The Ridgeway, Mill Hill, N.W.7.
22nd (Thurs.) Spring Meeting of the North of Scotland Division, B.V.A. at the Northern Hotel, Aberdeen, 2.30 p.m.
27th (Tues.) General Meeting of the Society of Practising Veterinary Surgeons, B.V.A., at the Department of Veterinary Surgery, Langford, 2.30 p.m.

April

4th, 5th & 6th. B.V.A. Council and Committee Meetings at Royal (Dick) School of Veterinary Studies, Edinburgh.
6th (Fri.) Meeting of the North Wales Division, B.V.A. at Ruthin, 2.0.
7th (Sat.) 10th Annual Dinner of the B.R.X. Club at the Royal Veterinary College, 6 p.m.
20th (Fri.) Meeting of the Mid-West Division, B.V.A.

PERSONAL

Births

KEEP. - On 18th February, 1956 to Pearl Jane (nee Levens-Ing M.R.C.V.S.) wife of Michael Eric Keep, M.R.C.V.S. of The Veterinary Hospital, P.O. Box 1, Sandown, Johannesburg, a son, Christopher Michael.

CLAYDON.- On 29th January, 1956 at the Zomba European Hospital, Nyasaland to Gillian and Roy Claydon, M.R.C.V.S., a daughter, sister for Deborah.

APPOINTMENTS VACANT

Assistant required for busy mixed practice, South West; salary from £700 according to experience, with regular increments. Organised leisure with use of car. Unfurnished flat available from April, references essential. Interview expenses paid.-Box 183.

Lady assistant required. Short term during illness of partner.- Tennant, 19 Richmond Hill, Bristol, 8. Tel: Bristol 38768.

Assistant required in fairly large mixed general practice in South-East. The post is a progressive one, apart from the salary which will range from £700-£1,150 according to experience. Interview essential, expenses paid. Reply with references to Box 201.

Assistant, single, required in mainly agricultural practice, March or early April. Eastern Counties. Eligible L.V.I. Regular leisure, use of car. Commencing salary £700-£800 according to ability. Interview expenses paid.-Box 203.

Wanted, reliable assistant, mixed country practice. Eligible L.V.I. preferable. Good house, good conditions, good salary. Interview expenses paid. - Box 204

Woman assistant required shortly, mainly for small animal work in mixed practice in Surrey. - Box 205.

Assistant eligible L.V.I. required for agricultural practice in North-West. Salary £800 x £50 to £1,000. Regular leisure. Interview essential at advertiser's expense. - Wood, Kendal.

Assistant required, agricultural practice, preferable eligible L.V.I. Good salary. - Johnson, 33 Junction Road, Kirkwall, Orkney.

£750 - £800, regular leisure, reasonable use of car, offered to keen young practitioner in return for assistant in Midlands mixed practice. Interview essential, expenses paid. Apply with references to Box 208.

Capable married assistant needed. Must be experienced all branches. Regular leisure, etc. Practice in S.E. England. Good salary paid. - Box 214.

Mixed practice, Southern England, requires assistant. All applications acknowledged. - Box 218.

Assistant required in small animal practice near London. Self contained flat available.- Matthews, 56 Pembroke Road, Ruislip, Middx.

Male or female assistant of experience wanted for small animal side of general practice in East Anglia. Send full particulars. - Box 220

Locum wanted for small animal practice May to June. - Box 221

Experienced assistant wanted in general practice, mainly agricultural, good prospects for suitable man. Write fully.- Box 222

Capable assistant required in agricultural practice, West Devon. Salary £750-£1,100 p.a. plus usual perquisites, according to experience. Car supplied if necessary. Full details and references in first instance to Box 223.

Single Male assistant required in mixed practice Herefordshire. Interview expenses paid.- John N. Peatt, Leominster 2266.